Virginia Department of Health
Vaccinia Disease and Vaccinia Related Adverse Events: Overview for Healthcare Providers

Organism	Vaccinia virus, used in smallpox vaccine; genus *Orthopoxvirus*, family *Poxviridae*
Transmission	Inoculation with vaccine (Dryvax®) or through direct contact with vaccine site or infectious materials
Communicability	Communicable to unvaccinated contacts; maximum viral shedding 4-15 days post-vaccination; virus can be cultured ~ 2-5 days post-vaccination until scab separates (14-21 days post-vaccination); 2^{o} transmission usually results in eczema vaccinatum or inadvertent inoculation ~ 5-19 days post-exp.
Risk Factors	Eczema or atopic dermatitis and other acute, chronic or exfoliative skin conditions; diseases, conditions or treatments which cause immunodeficiency or immunosuppression
Pregnancy	Risk for fetal vaccinia if inadvertent vaccination during pregnancy; counsel female about risks to fetus
Normal Site Reaction	Papule (3-5 days post-vaccination) → vesicle (days 5-8) → pustule (maximum size in 8-10 days) → scab (separates 14-21 days post-vaccination) → pitted scar
Normal Variants (rate 2.4% - 6.6%)	Satellite lesions; lymphangitis from site to regional nodes; regional lymphadenopathy; considerable local edema at the site; intense erythema (viral cellulitis). Variants usually resolve spontaneously.
Adverse Events *Post-exp (post-exposure) means after inoculation with the vaccine or after direct contact with vaccine site or infectious materials.*	
Serious	**Bacterial infections:** uncommon. Vaccinia Immune Globulin (VIG) not recommended. Obtain Gram stain, bacterial culture. Treat with antibiotics if clinically indicated; no topical medications.
Serious	**Inadvertent inoculation:** virus is transferred from vaccination site to 2^{nd} location on vaccinee or close contact; most common adverse event; often involves face, eyelid, nose, mouth, lips, genitalia, anus. Use contact precautions. If few lesions, no specific treatment required; usually resolves ~ 3 weeks. Administer VIG with extensive lesions, especially if confluent or covering large portions of body.
Serious	**Ocular vaccinia:** inflammation involving periocular soft tissue or the eye itself (conjunctivitis, blepharitis, iritis or keratitis). Consult ophthalmologist. Treat with off-label topical antivirals. Administer VIG for severe conditions. **For Keratitis**: Consult ophthalmologist immediately. Treat with off-label topical antivirals; consider topical prophylactic antibacterials. VIG contraindicated unless life or other vision-threatening conditions present.
Serious	**Erythema multiforme:** rash may be erythematous macules, papules, urticaria, bulls-eye lesions, and rarely vesicles. Occurs ~ 10 days post-exp. Treat symptoms; consider oral antipruritics. Rare evolution to Stevens-Johnson syndrome requires hospitalization. VIG not recommended. *Diff.Dx: generalized vaccinia; inadvertent inoculation.*
Serious	**Generalized vaccinia:** disseminated maculopapular or vesicular lesions; usually self-limiting; occurs ~ 6-9 days post-exp. Use contact precautions. Cover lesions; if not possible, avoid physical contact with others. Administer VIG if severe/recurrent but not if mild or limited. Antivirals usually not indicated. Consider NSAIDS; oral antipruritics. *Diff.Dx: erythema multiforme, eczema vaccinatum, progressive vaccinia, severe varicella; inadvertent inoculation at multiple sites; smallpox; disseminated herpes.*
Life-threatening	**Eczema vaccinatum:** vaccinial lesions, generalized or focal, in persons with eczema/atopic dermatitis history. Occurs ~ 5-19 days post-exp. Fever/lymphadenopathy often present. Use contact precautions. Early diagnosis & early treatment with VIG are critical. Monitor patient for secondary skin infections.
Life-threatening	**Post-vaccinial encephalopathy/encephalomyelitis:** uncommon; occurs ~ 6-15 days post-exp with change in mental status (confusion, delirium, somnolence) or in sensorimotor function (altered sensation, paresis). VIG not recommended; supportive care; anticonvulsants as needed.
Life-threatening	**Progressive vaccinia:** severe, potentially fatal, spreading necrosis at vaccination site; metastatic necrotic lesions may occur elsewhere on body. Suspect if lesion progresses w/o healing ≥15 days post-exp. Use contact precautions. Administer VIG. Surgical debridement not proven useful. *Diff.Dx: severe bacterial infection; severe varicella; other necrotic conditions; disseminated herpes.*
Life-threatening	**Fetal vaccinia:** extremely rare; generalized vaccinial type (vesicular, pustular or ulcerative) rash in newborn of vaccinated mother. Efficacy of VIG in newborn is unknown; antivirals not recommended.
Sample Collection	For consult, page the state lab (DCLS), available 24/7, at 804-418-9923.
Infection Control	Virus inactivated by a solution of 1 part household bleach to 9 parts water (0.5% sodium hypochlorite solution). After contact with vaccine site, wash hands thoroughly with soap and water or disinfectant.
VIG/Cidofovir IND Treatment	VIG and Cidofovir can be obtained only after consultation with local health department or CDC Clinician Information Line, available 24/7 at 877-554-4625. Cidofovir is for 2^{nd} line treatment only.
Reporting Vaccinia Disease and Vaccinia Adverse Events	Vaccinia disease and vaccinia adverse events must be reported rapidly. *Serious or unexpected adverse events requiring CDC consultation or IND therapies* should be reported immediately to the local health department and the CDC Clinician Information Line. All other adverse events should be reported by phone within 24 hours to your **local health department**, which will complete a Vaccine Adverse Events Reporting System (VAERS) form and supplemental surveillance worksheet for physicians.

For more information, refer to: CDC. Smallpox vaccination and adverse reactions: Guidance for clinicians. MMWR Dispatch 2003;52(January 24, 2003):1-31 Available online at: http://www.cdc.gov/mmwr/preview/mmwrhtml/di52cha1.htm

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